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Air Pollution: Fourth Follow-Up Report
Air Pollution Pilot Study

NATO Committee on the Challenges of Modern Society, Brussels (Belgium)

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COMMITTEE ON THE CHALLENGES OF MODERN SOCIETY

NATO CDSM

OTAN CCMS

AIR POLLUTION

FOURTH FOLLOW-UP REPORT - AIR POLLUTION PILOT STUDY

N. 96

POLLUTION ATMOSPHERIQUE

QUATRIEME RAPPORT SUR LES SUITES A DONNER DE L'ETUDE PILOTE SUR LA POLLUTION ATMOSPHERIQUE

COMITE SUR LES DEFIS DE LA SOCIETE MODERNE

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16. ABSTRACT

The fourth follow-up report on the 15 Air Pollution Pilot Study recommendations is to monitor the status of the adoption of NAC NATO/CCMS Recommendations I,II,III,IV,V,VII, and VIII in cities with population over 600,000 in 1978. The report also can be compared to the 1975, 1976, and 1977 survey responses and the first three follow-up reports to evaluate changes in air pollution activities in the past three years. The NAC NATO/CCMS recommendations listed above include general assessment of air pollution, standard-setting, establishment of air quality monitoring systems and suitable systems for retrieval and storage of data, employment of recognized reference methods for monitoring, and institution of uniform procedures for conduction emissions inventories.

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AIR POLLUTION

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AIR POLLUTION PILOT STUDY

(POLLUTION ATMOSPHERIQUE

QUATRIEME RAPPORT SUPPLEMENTAIRE -

ETUDE PILOTE DE POLLUTION ATMOSPHERIQUE)

N. 96

Prepared by

United States of America

as ex-Pilot of the Study

NATO Committee

on the

Challenges of Modern Society

October, 1978

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EXECUTIVE SUMMARY:

FOURTH AIR POLLUTION PILOT STUDY FOLLOW-UP REPORT

The fourth follow-up report on the 15 Air Pollution Pilot Study recommendations is to monitor the status of the adoption of NAC NATO/CCMS Recommendations I, II, III, IV, V, VII, and VIII in cities with population over 600,000 in 1978. The report also can be compared to the 1975, 1976 and 1977 survey responses and the first three follow-up reports to evaluate changes in air pollution activities in the past three years. The NAC NATO/CCMS recommendations listed above include general assessment of air pollution, standard-setting, establishment of air quality monitoring systems and suitable systems for retrieval and storage of data, employment of recognized reference methods for monitoring, and institution of uniform procedures for conducting emissions inventories.

Responsiveness

The 1978 survey included 51 cities with populations over 600,000 and the capitals of the three nations with no cities over 600,000. At the time of preparation of this report, responses had been received for 39 of the 54 cities. Of the eight responding nations, six nations submitted completed questionnaires for all surveyed cities. Seven nations have yet to respond.

STANDARDS AND CONTROL APPROACHES

A basic difference in the approaches and objectives of national air pollution programs involves ambient standards. Some nations place primary emphasis on the quality of ambient air, while others concentrate on standards set for specific categories of emission sources. A total of six nations reported ambient standards. This includes newly-reported standards in one nation.

AMBIENT MONITORING

Objectives

The objectives of current monitoring systems were ranked to provide a reference point for evaluation of the effectiveness of systems. All nations with ambient air quality standards reported assessment of compliance with standards as their first priority objective. Trend analysis and control strategy planning were generally ranked above health research and emergency episode operations. Validation of dispersion models has a uniformly low priority. One nation reported significant revision of priorities since the 1977 survey. Other nations have had only minor changes or no changes at all.

Instrumentation

All responding nations and cities have monitoring sites. Only two nations lacked meteorological instruments in some cities. Only one city reported no automatic instruments, and eleven cities reported at least half of their instruments automated. Basic differences in monitoring techniques and strategies result in wide variations of the number of monitoring sites in cities. Only a few minor changes in monitoring instrumentation have been reported since 1975.

Ambient Monitoring Statistics

The nations reporting ambient air quality standards also reported ambient monitoring statistics for almost every relevant pollutant. Two nations did not report current ambient monitoring statistics corresponding to one or more standards. All responding nations reported statistics for at least two pollutants.

ANALYSIS OF AMBIENT AIR QUALITY TRENDS

A total of 81 analyses of ambient air quality trends was reported, for seven nations and 35 cities. One reporting nation and four reporting cities had no trend analysis. Thirteen cities reported a trend for only one pollutant. The trend analyses were predominantly for SO_2 and TSP. Some analyses of trends for CO, O_x, and NO_x were reported. The average length of monitoring period for trend analysis was 6 years. Most of the analyses were for periods ending in 1977. A few were only for one year.

Forty-three cases of improving air quality (constant decreasing ambient concentration) and 18 cases of stable air quality over the entire analysis period were reported. There were five reported cases of air quality declining over the entire analysis period, and a number of variable trends were also reported.

INTRODUCTION

This is the fourth follow-up report on the 15 Air Pollution Pilot Study Recommendations. Information for the report was collected through a questionnaire prepared by the United States, as pilot of the completed first air pollution pilot study. (See Appendix for the 15 Recommendations.)

The Plan called for annual reporting to track progress of member nations with respect to eight of the 15 recommendations. Specifically, the first, second, and third reports (issued September 19, 1975, September 24, 1976, and September 26, 1977) and this fourth report concentrate on the status of Recommendations I, II, III, IV, V, VII, VIII in cities with populations over 600,000. These Recommendations include general assessment of air pollution standard-setting, establishment of air quality monitoring systems and suitable systems for retrieval and storage of data, employment of recognized reference methods for monitoring, and institution of uniform procedures for conducting emissions inventories. Recommendation XIV, concerning air quality modeling, has been dropped from this report. It is expected that this topic will be the subject of a separate report. The results of this fourth year's follow-up questionnaire, analyzed in this report, are intended to provide information on current activities relevant to the Recommendations listed above and to allow comparison with activities reported in response to the three preceding follow-up surveys.

Responsiveness

Eight nations submitted responses for a total of thirty-nine cities. Six of these nations submitted completed questionnaires for all surveyed cities. Two nations submitted completed questionnaires for all but one

or two cities. Responses have yet to be received from seven nations. Five of these nations did not submit questionnaires in last year's survey.

The survey included 51 cities with populations over 600,000 and the capitals of the three nations with no cities over 600,000. At the time of report finalization, responses had been received for 39 of these 54 cities, as listed in Figure 1. All but five of these cities also responded to all previous surveys. Seven cities have not responded to any of the four annual surveys, and seven other cities have responded only once or twice.

When blank lines appear beside a city or a nation in figures with this report, they indicate that no response was received from that city or nation for that question. To assure currency of the information in this report, information reported for previous follow-up reports was not used.

Populations and Areas of Reporting Cities

Figure 2 presents the populations and areas of reporting cities. These statistics are useful in assessing the relative magnitude or significance of various information (e.g., air quality data, number of monitoring sites, refinement of control efforts). Differences in geographical approaches to air pollution control between nations result in considerable variety in the types of areas and populations for which responses were made. Some nations included only the highly urbanized areas within the political boundaries of a city. Others reported for areas including suburbs and surrounding countryside, based on the air basin concept or an approach such as the Air Quality Control Region used in the U.S.

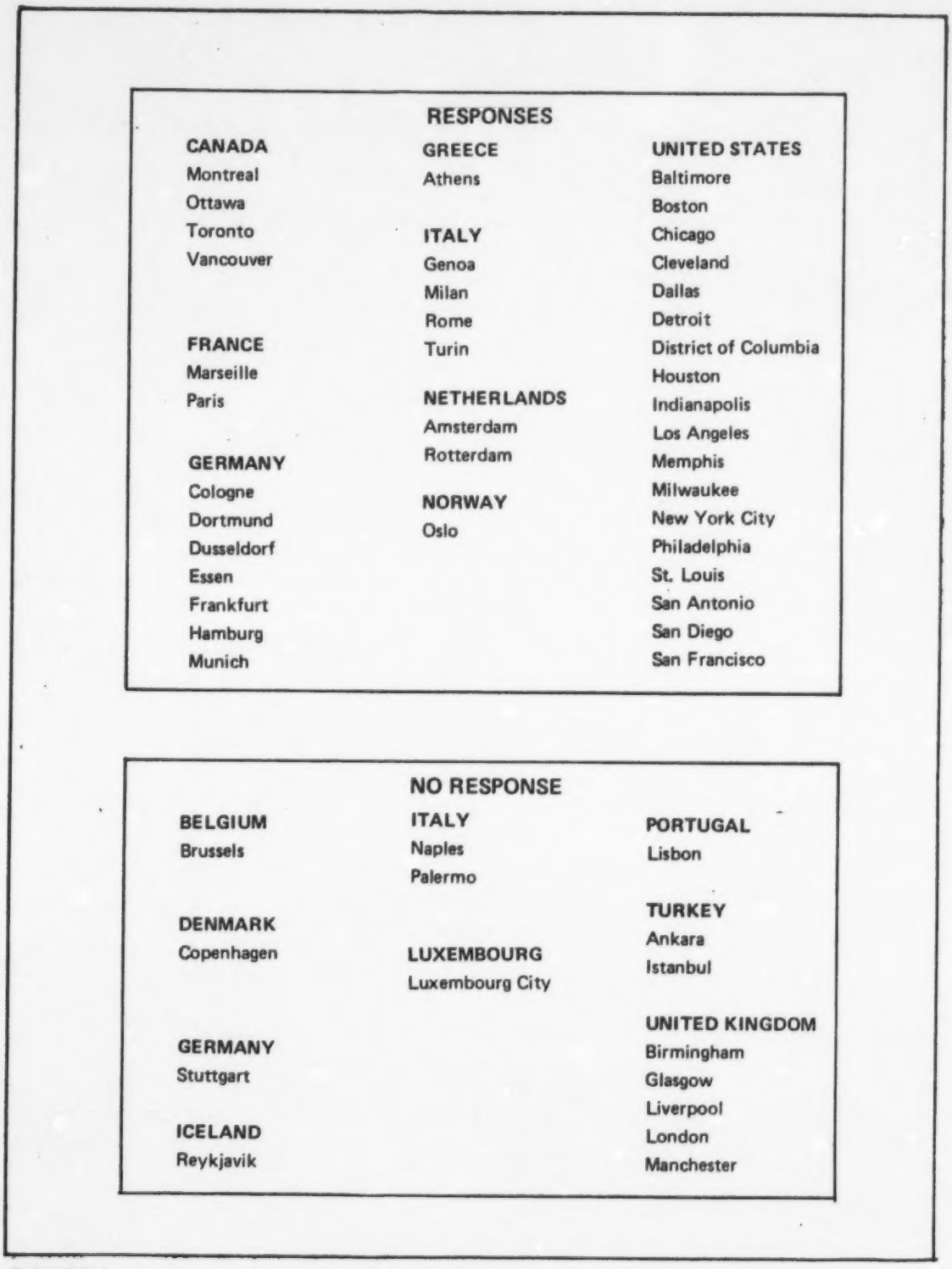

FIGURE 1
Survey Responses

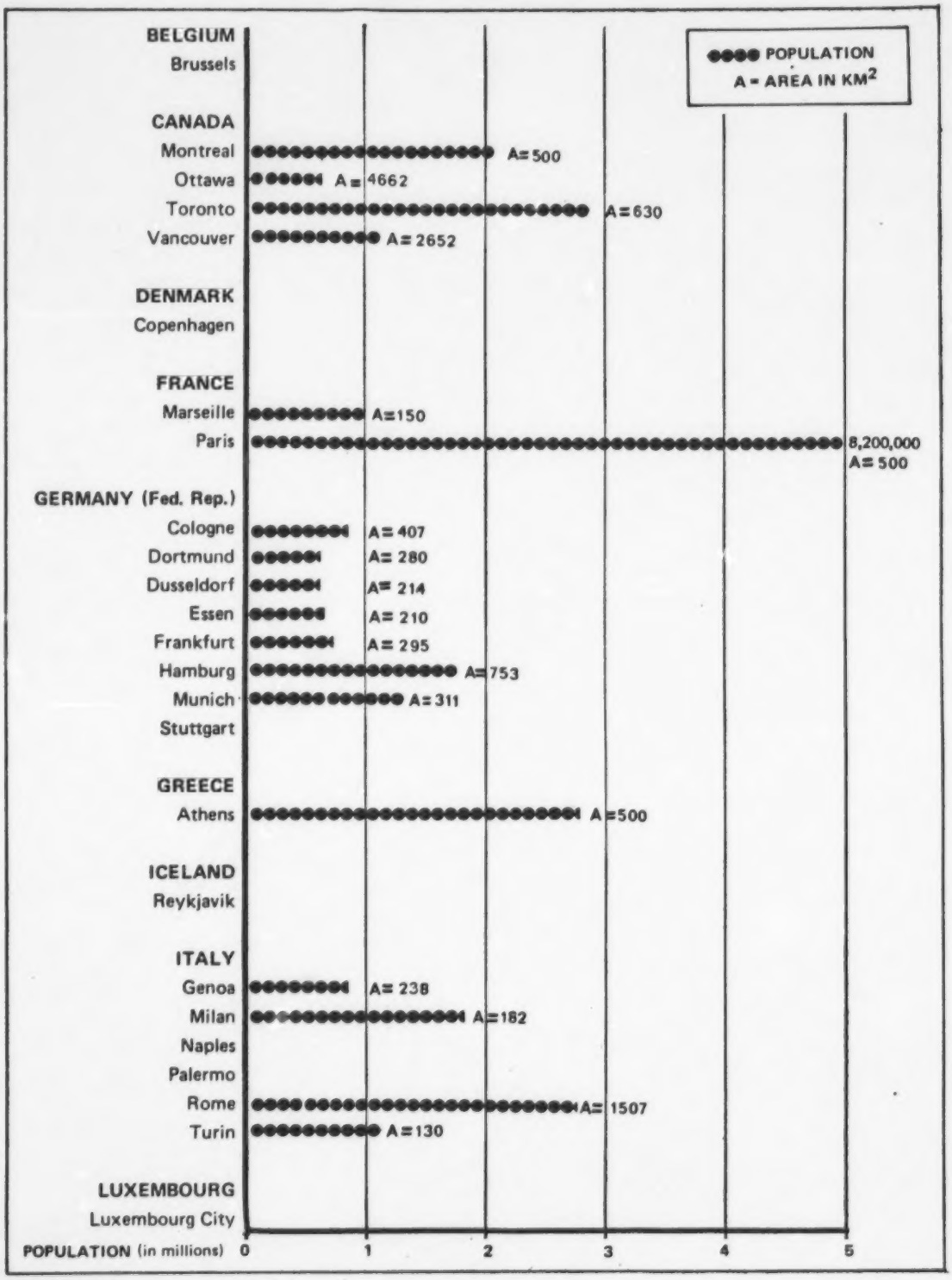

FIGURE 2
Reported Populations and Areas

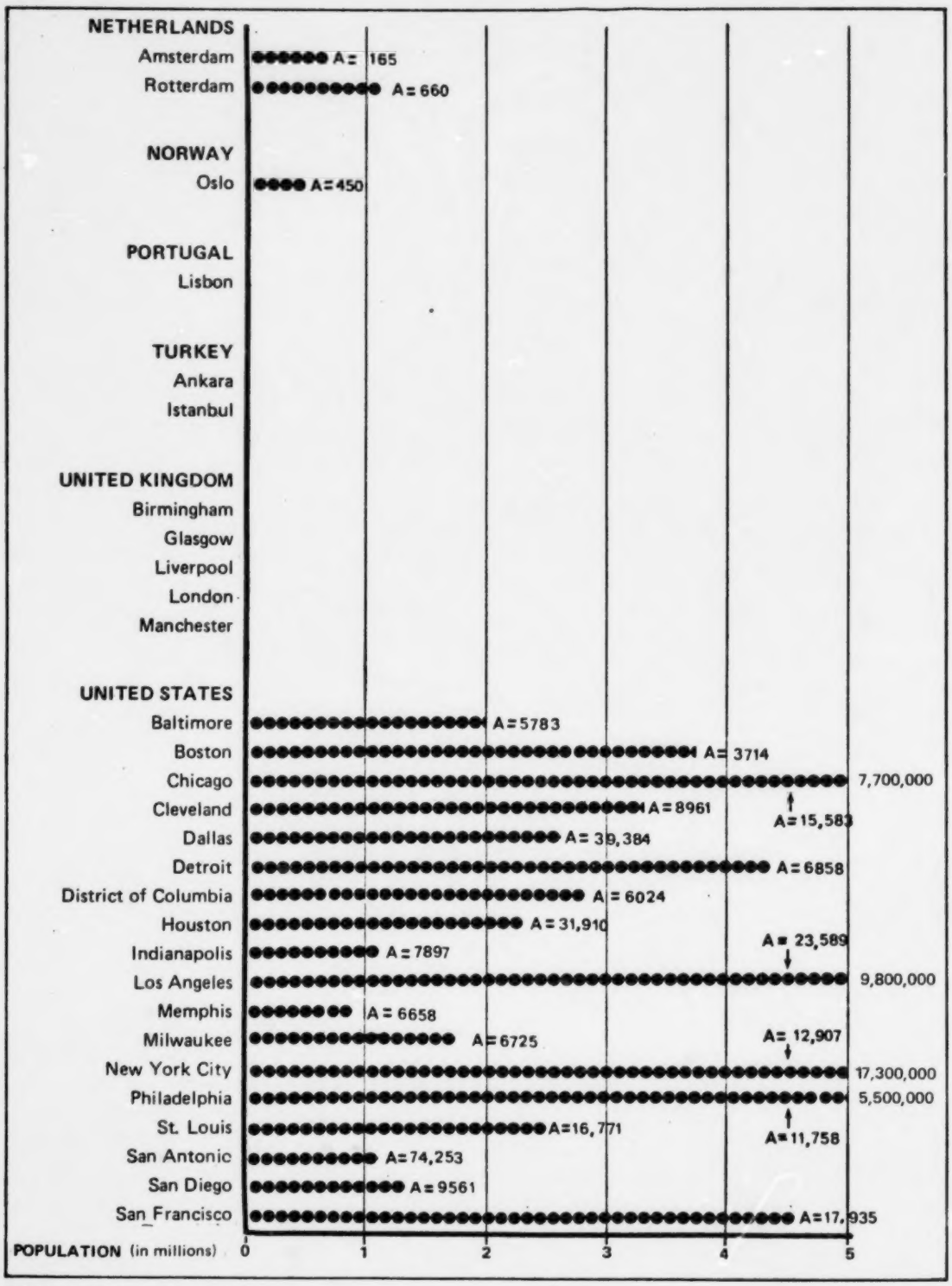

FIGURE 2 (continued)
Reported Populations and Areas

Standard and Control Approaches

Recommendation VIII of the Air Pollution Pilot Study encourages member nations to set ambient air quality standards or objectives using CCMS and World Health Organization (WHO) criteria to establish those standards in accordance with national priorities. One of the basic differences in the approaches and objectives of national air pollution programs involves ambient standards. Some nations place primary emphasis on the quality of ambient air, while others concentrate on standards set for specific categories of emission sources.

Responses to the current survey indicate that one nation has recently established ambient air quality standards for TSP, SO_x, CO, and O_x. A total of six nations reported ambient standards in this survey, as shown in Figure 3. Eight nations have never reported any ambient standards. The numerical values of the ambient standards reported in earlier surveys have not changed. Often standards are not comparable in terms of averaging or other statistical techniques. Monitoring schemes, by which the standards are applied, are either population-oriented, industry-oriented, or located on a grid system.

All nations with ambient TSP, SO_2, and CO standards reported both short-term and long-term standards. All but one nation have 24-hour and annual standards for TSP. Most nations have annual long-term SO_2 standards. Short-term SO_2 standards are mostly daily averages, with some hourly or one-half hour averages. One nation has 24-hour and two-hour TSP standards, and 24-hour and one-half-hour SO_2 standards. One nation employs an average over the six winter months for long-term TSP and SO_2 standards. Short-term CO standards are for one-half hour or one hour. Long-term CO standards are all

	AMBIENT STANDARDS				NUMBER OF SOURCE STANDARDS
	TSP	SO_x	CO	O_x	
BELGIUM					
CANADA	●	●	●	●	16
DENMARK					
FRANCE					
GERMANY (Fed. Rep.)	●	●	●		
GREECE					
ICELAND					
ITALY	●	●	●		
LUXEMBOURG					
NETHERLANDS	●	●	●	●	12
NORWAY	●	●			3
PORTUGAL					
TURKEY					
UNITED KINGDOM					
UNITED STATES	●	●	●	●	13

FIGURE 3
Nations Reporting Standards

8-hour averages, except for one annual average. Oxidant (O_x) and NO_x standards are also mixed, including half-hour, one-hour, daily and annual averages. Three countries have one or more percentile-based standards (e.g. 95 or 98 percent of values must be below the standard), while most standards are limits not to be exceeded at any time.

Four nations reported emissions source standards in the current survey. One of these nations had not reported source standards before, and one nation has added standards for six source types. Six nations have never reported any source standards. (Nations are checked in Figure 3 if they reported any type of ambient standard. When cities within single countries reported differing sets of local or regional standards, the total of unduplicated source categories for the whole country is presented.)

AMBIENT MONITORING

Objectives

Recommendation II of the Air Pollution Pilot Study encourages establishment of an effective air quality monitoring system, including measurement of meteorological parameters. The objectives of current monitoring systems were ranked to provide a reference point for evaluation of the effectiveness of systems. These rankings by cities were aggregated to remove slight differences within nations, and are presented in Figure 4.

All nations reporting ambient air quality standards reported the assessment of compliance with these standards as the first priority objective of their monitoring systems. Trend analysis and control strategy planning were generally ranked above health research and emergency episode operations,

	ASSESS COMPLIANCE WITH STANDARDS	HEALTH RESEARCH	TREND ANALYSIS	CONTROL STRATEGY PLANNING	EMERGENCY EPISODE OPERATIONS	DISPERSION MODEL VALIDATION
BELGIUM						
CANADA	1	5	3	2	4	6
DENMARK						
FRANCE		4	2	3	1	5
GERMANY (Fed. Rep.)	1	5	4	3	2	6
GREECE		1	2	3	4	5
ICELAND						
ITALY	1	5	2	4	3	6
LUXEMBOURG						
NETHERLANDS	1	5	3	2	4	6
NORWAY	1	4	2	3	6	5
PORTUGAL						
TURKEY						
UNITED KINGDOM						
UNITED STATES	1	6	2	3	4	5

FIGURE 4
Monitoring Objectives

although these rankings differed considerably between countries. Dispersion model validation received a uniformly low priority. Variations in rankings obtained for different cities in some nations indicate that these rankings do not necessarily represent official or legislated national objectives.

Most nations have reported little or no change in monitoring objectives. Two nations have reported no change since the first follow-up survey. One nation reported significant revision of priorities since last year's survey.

Instrumentation

Figure 5 shows the number of ambient monitoring sites reported by each city and the degree of automation of these sites. Each responding city has some monitoring, and only one city has no automatic sites. Eleven cities reported at least half of their sites automated. Eight cities in two nations reported no meteorological instruments (see Figure 6). As observed in previous surveys, basic differences in monitoring techniques and strategies result in wide variations of the number of monitoring sites in cities. Only a few minor changes in monitoring instrumentation have been reported since the first survey in 1975, with no clear trend.

Handling of Ambient Monitoring Data

Recommendation IV calls for systems for storage and retrieval of monitoring data such as those employed by the WHO. The efficiency of data handling techniques used by reporting cities can be tracked by questions dealing with telemetering of data and automation of data handling. The responses to these questions have been summarized in Figure 7. All but one of the reporting nations use automatic data handling systems to some degree. The degree of automation employed varies considerably, both from nation to

nation and between cities in some nations. The data handling is almost completely computerized in two nations, and two more report automated or semi-automated handling of a majority of their data.

This year's responses were very similar to those received in 1977. One city reported a change from computerized to manual and semi-automatic systems, and three cities in one nation reported changes from mixed to fully computerized systems. Twenty-three cities, of the thirty-six responding, reported at least half of their data handled by semi-automatic or automatic methods. Six cities rely on totally manual data-handling, and seven others use manual methods for more than half of their data.

Ambient Monitoring Statistics

The nations reporting ambient air quality standards (Figure 3) also reported ambient monitoring statistics for almost every relevant pollutant. Two nations did not report current ambient monitoring statistics corresponding to one or more ambient standards. All responding nations reported statistics for at least two pollutants. Figures 8 and 9 summarize reported short-term ambient monitoring data for SO_2 and TSP, with related ambient air quality standards.

The monitoring statistics reported are generally sufficient only to assess the success of nations in meeting their own standards, and not for making international comparisons. This is due to differences in statistical techniques, monitoring strategies, instrumentation, and other variations between nations. A total of 39 cities reported statistics for SO_2, 34 for TSP, 28 for CO, 25 for O_x, 27 for NO_x, and 6 for other pollutants. Of 24

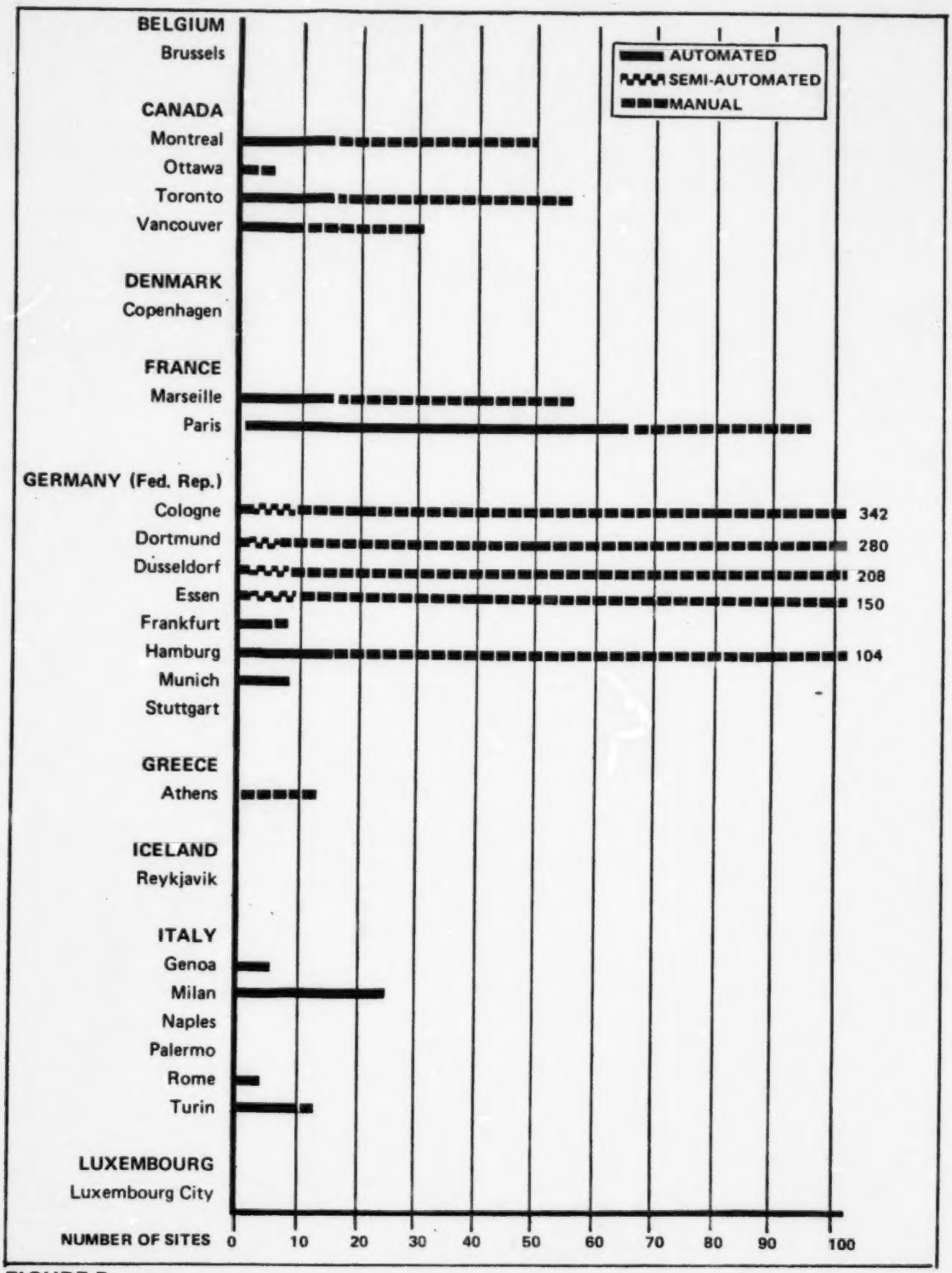

FIGURE 5

Sites with Automated and/or Manual Monitoring Instruments

(May contain double-counting of sites with multiple instrument types.)

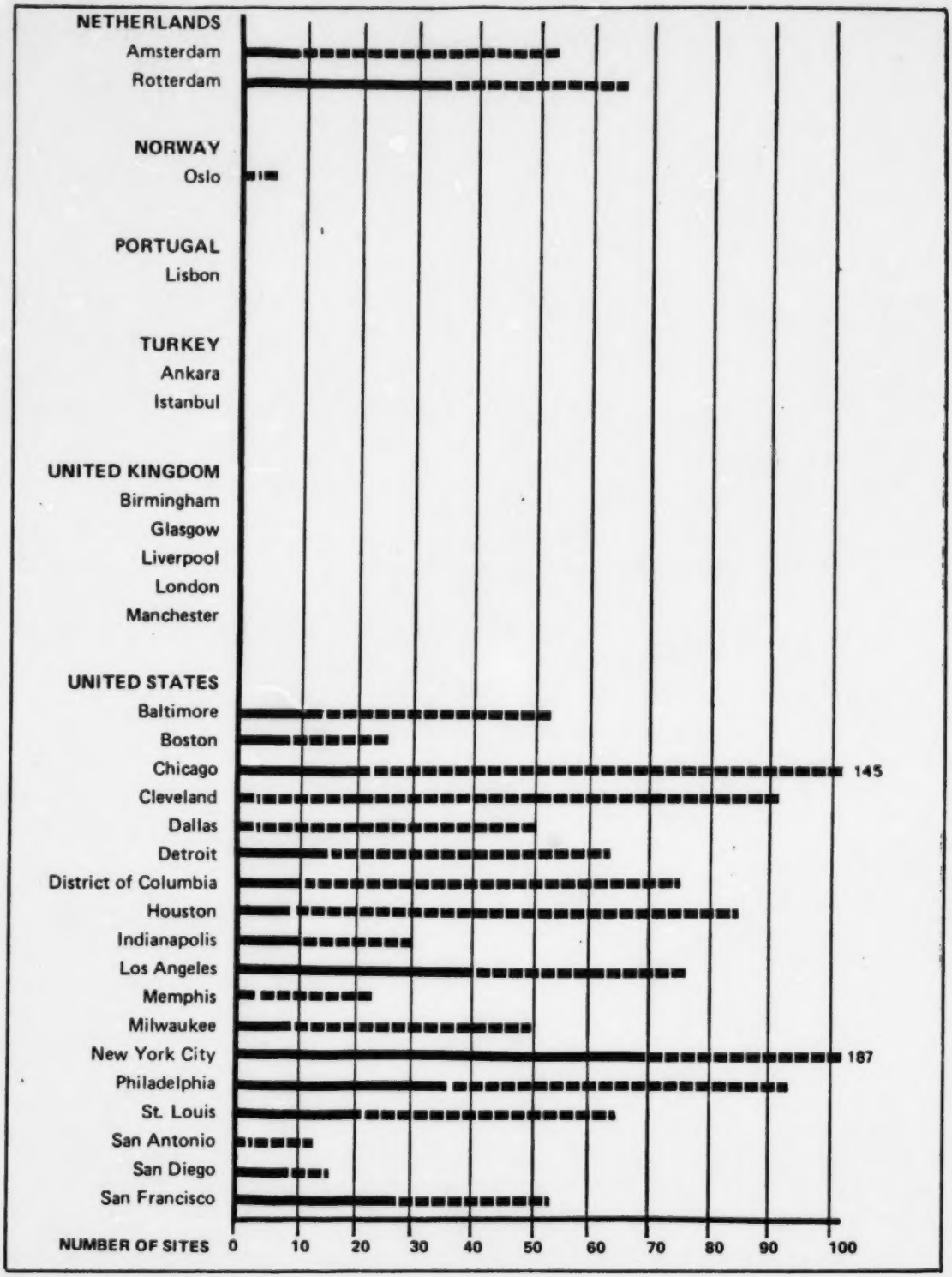

FIGURE 5 (continued)
Sites with Automated and/or Manual Monitoring Instruments

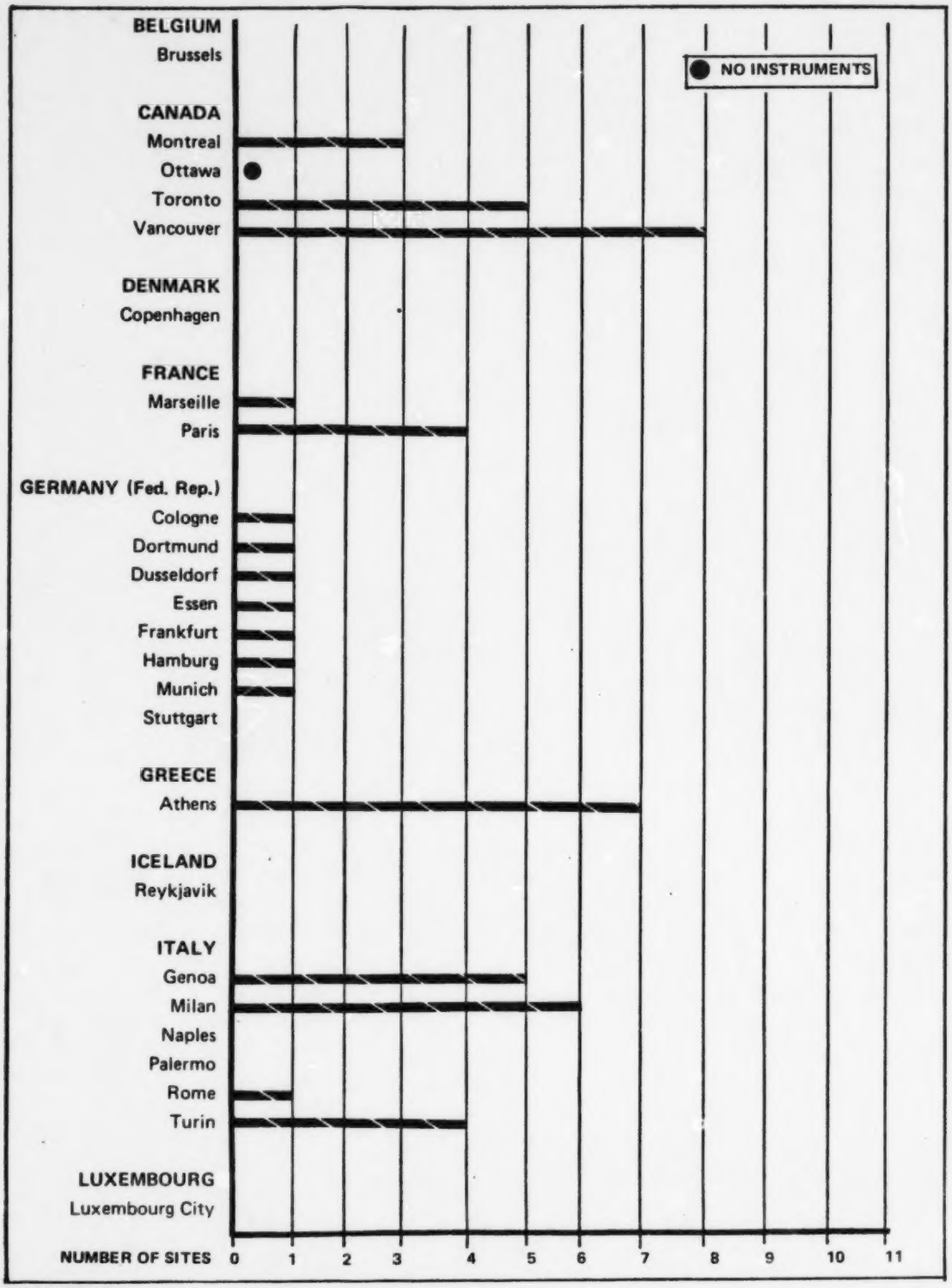

FIGURE 6
Sites with Wind Speed and Direction Instruments

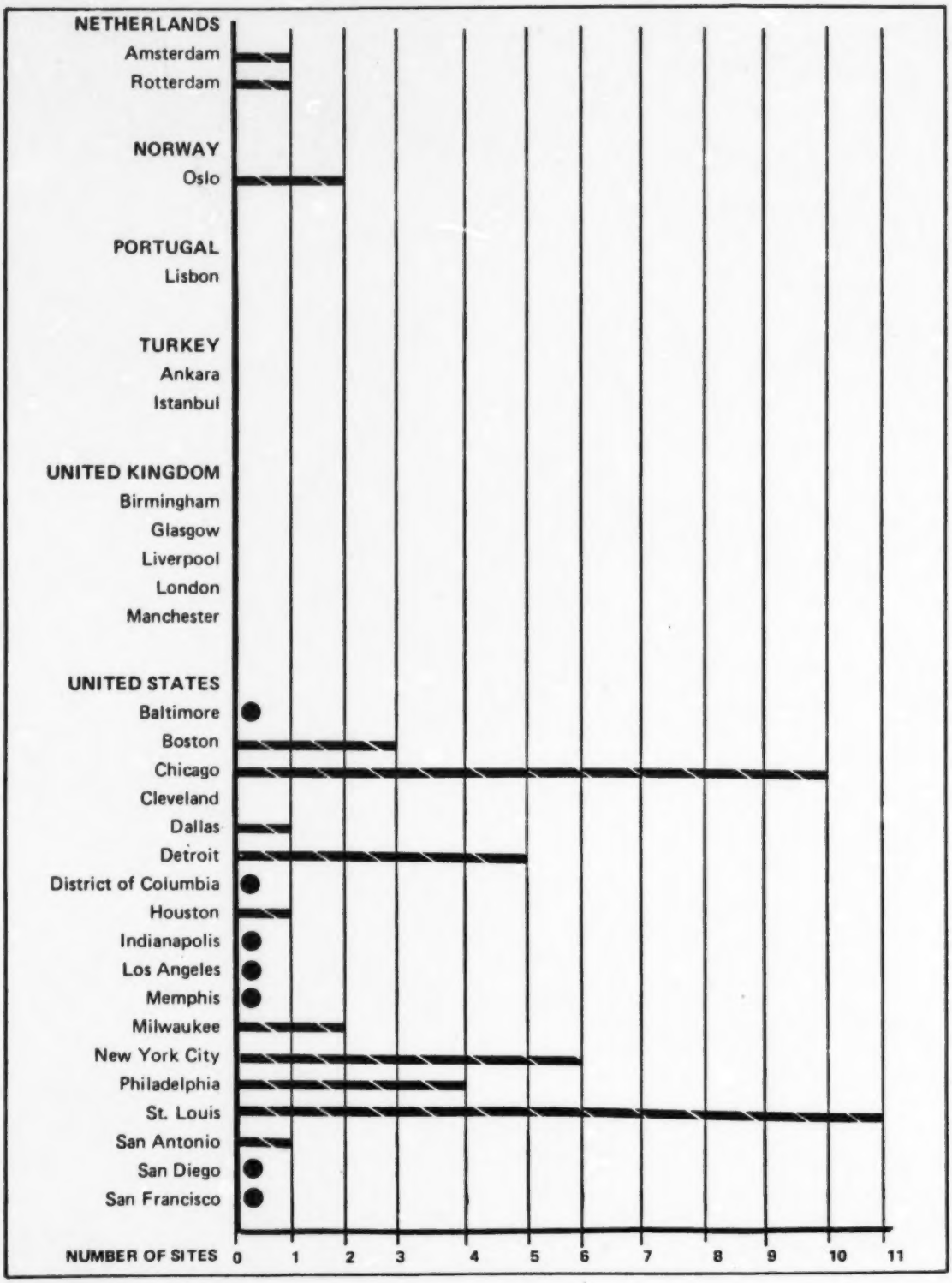

FIGURE 6 (continued)
Sites with Wind Speed and Direction Instruments

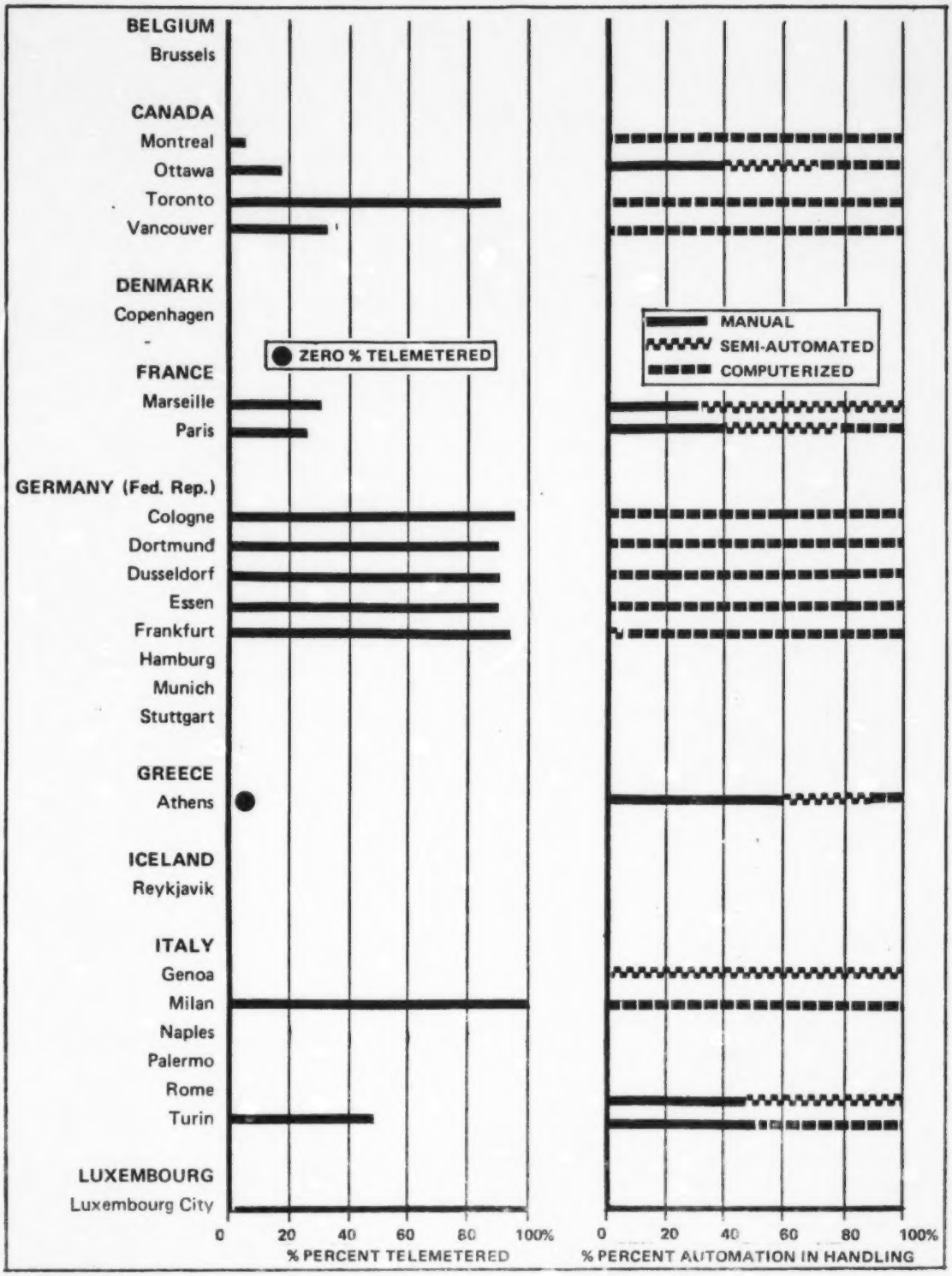

FIGURE 7
Monitoring Data Techniques

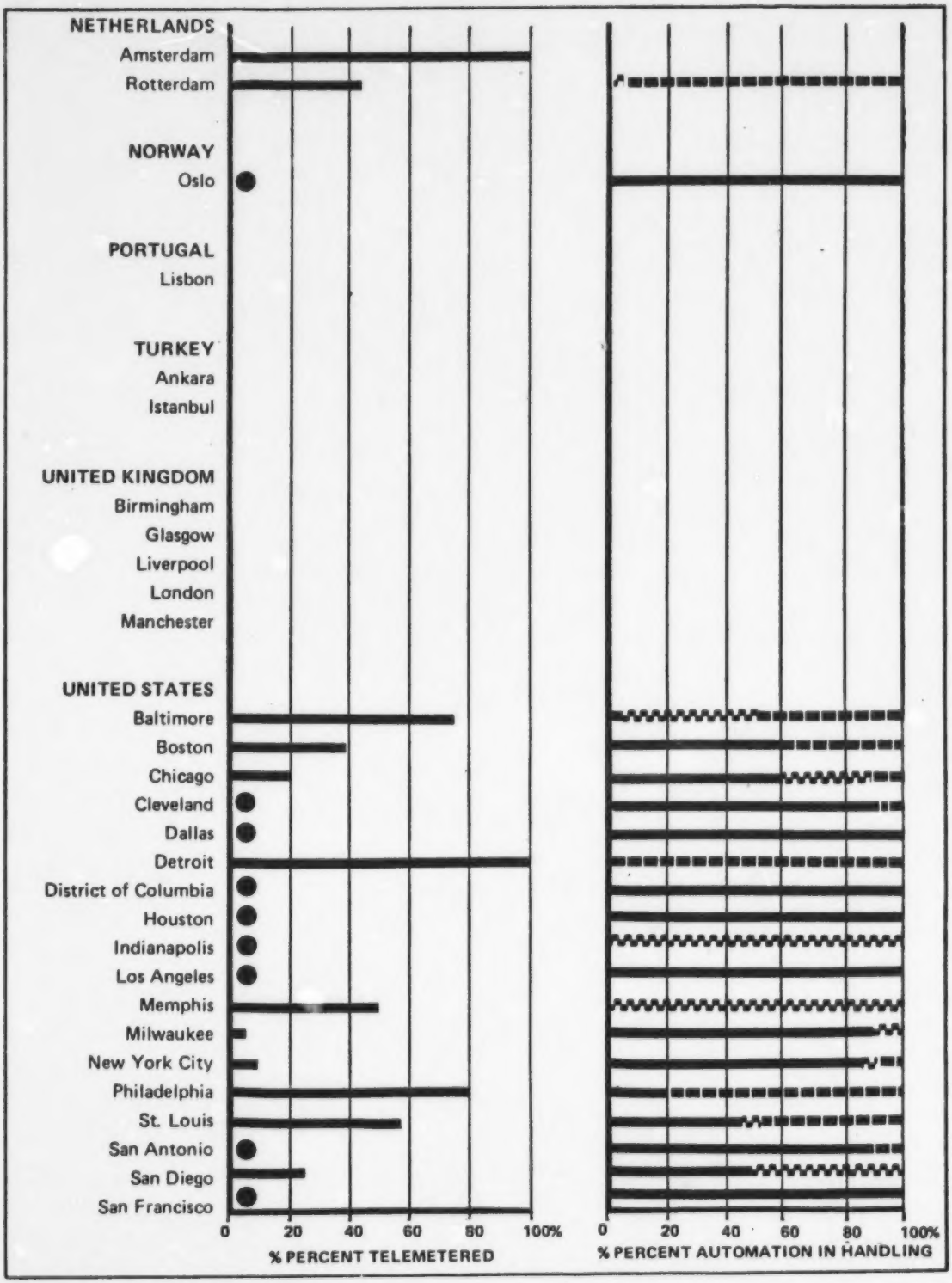

FIGURE 7 (continued)
Monitoring Data Techniques

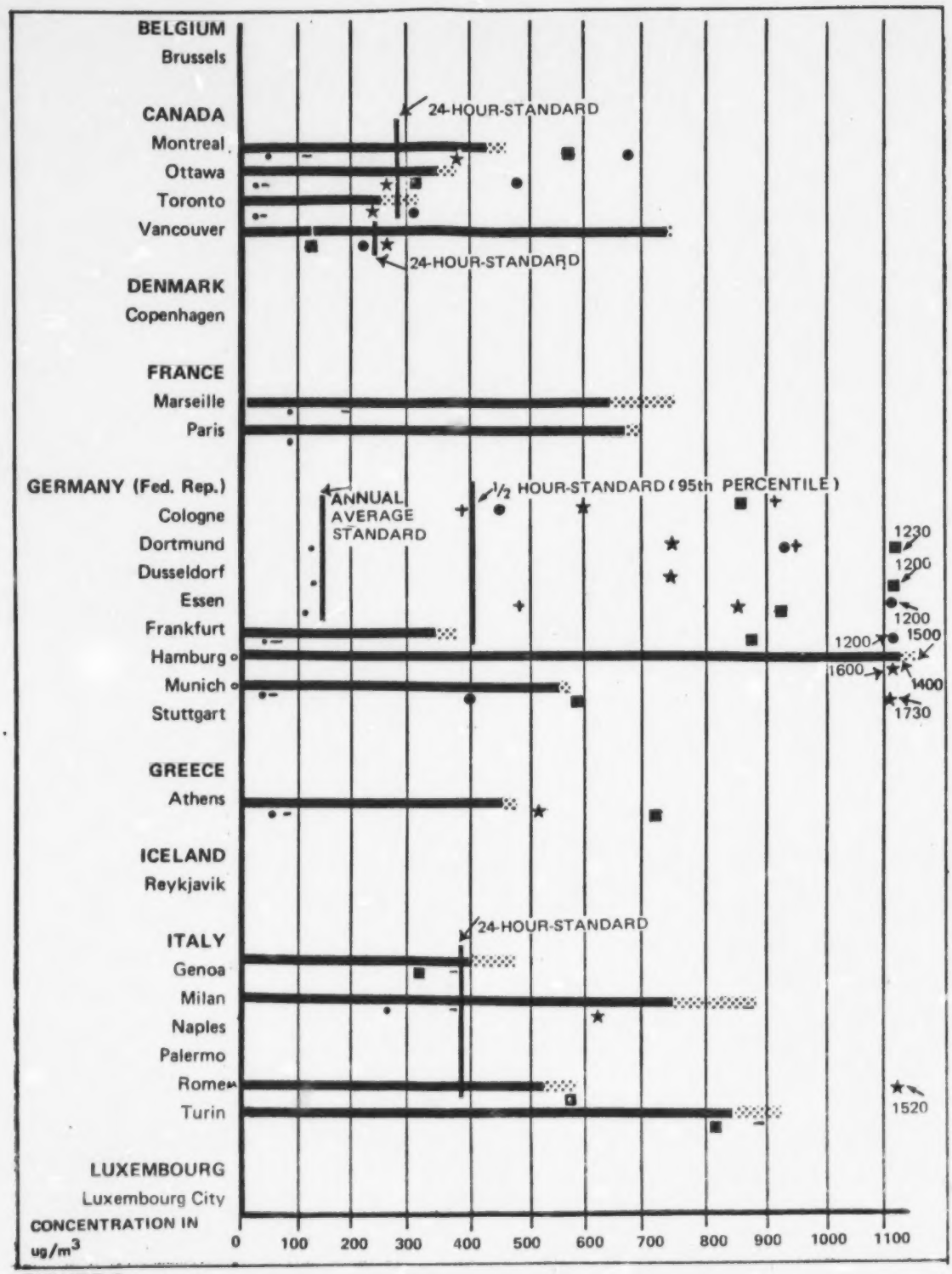

FIGURE 8
SO_2 Monitoring Data Compared to Standard

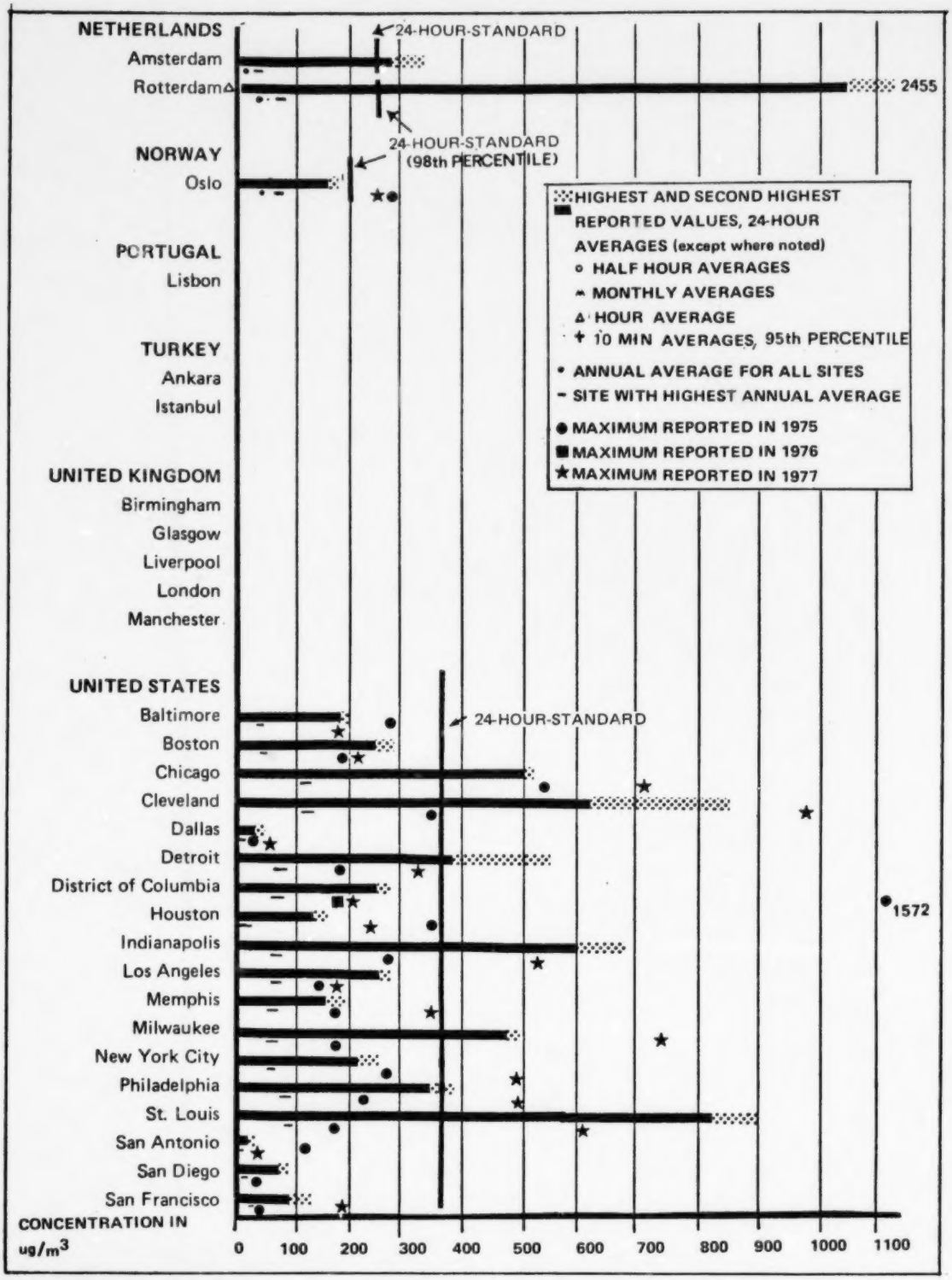

FIGURE 8 (continued)
SO_2 Monitoring Data Compared to Standard

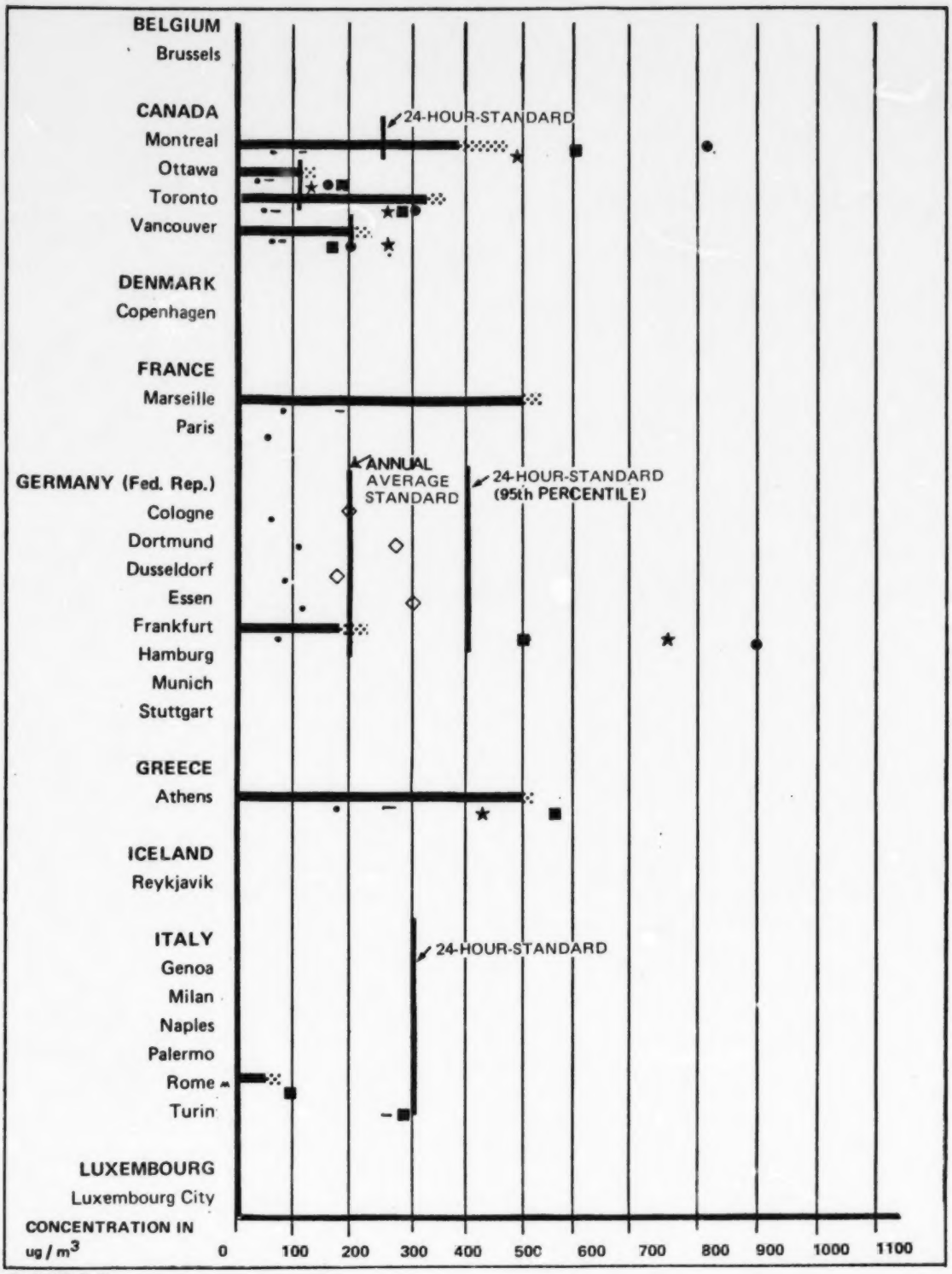

FIGURE 9
TSP Monitoring Data Compared to Standard

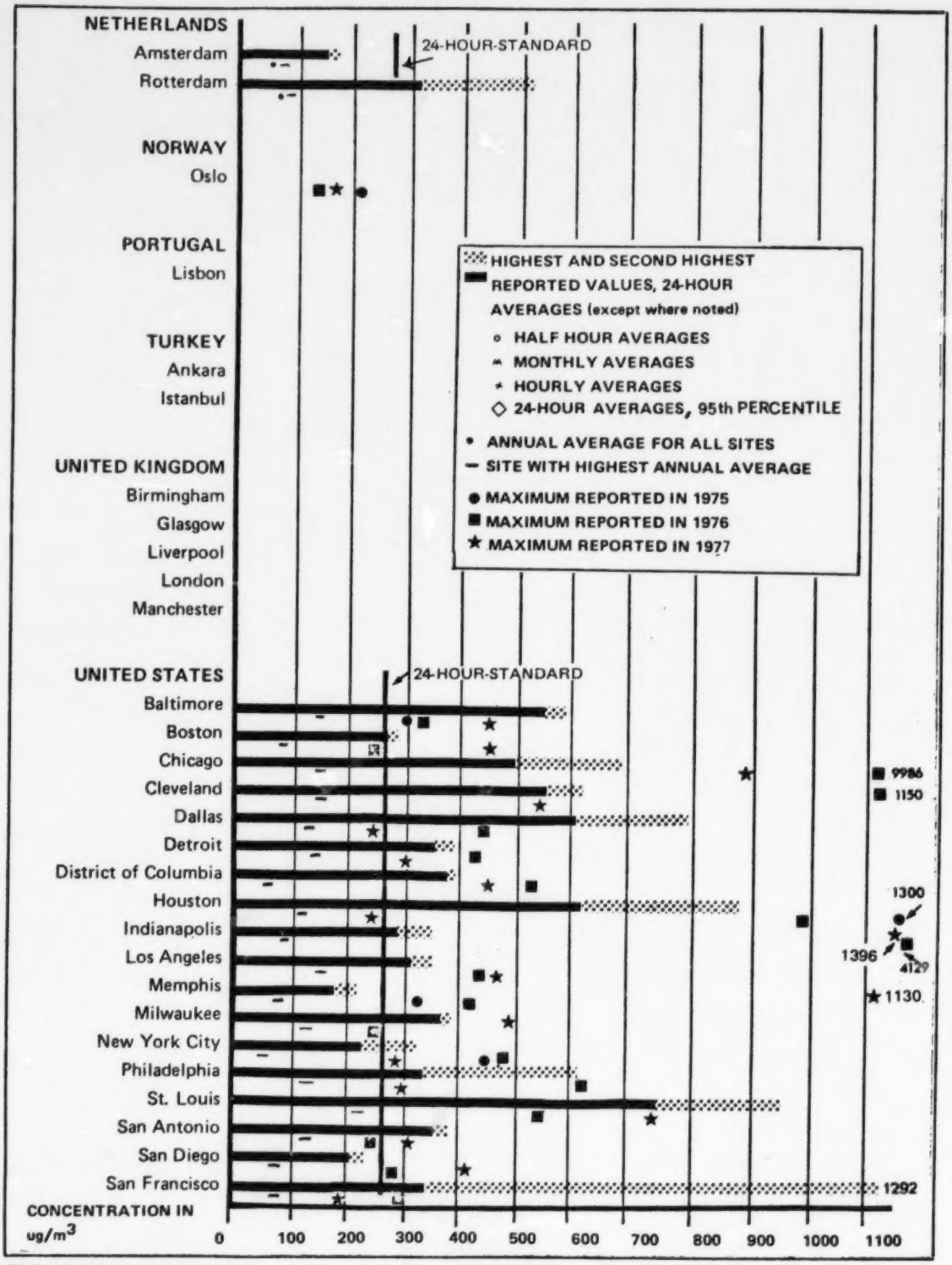

FIGURE 9 (continued)
TSP Monitoring Data Compared to Standard

cities reporting 24-hour TSP standards and corresponding ambient monitoring data, 20 cities exceeded standards. Of 29 cities with 24-hour SO_2 standards and data, 17 exceeded standards. Fourteen cities in one country exceeded that country's 8-hour CO standard, out of 26 cities reporting CO data and standards. All cities reporting O_x or O_3 data and standards exceeded their standards. NO_x standards were exceeded in 4 of 24 cities with data and standards. Data and standards were not reported for compatible time periods in two countries, making some comparisons impossible. In almost all cases, however, annual averages for all monitoring sites in the cities and annual averages for the maximum site in each city were far below the corresponding daily maximum values and standards. There is no distinct pattern in maximum statistics reported in the four years surveyed.

ANALYSIS OF AMBIENT AIR QUALITY TRENDS

One point of Recommendation XIV indicates the need for international coop ration to accomplish review of ongoing air quality assessment studies. Figure 10 shows actual trends and the period of monitoring used in trend analysis. Figure 11 summarizes the available trends by pollutant.

A total of 81 analyses of ambient air quality trends was reported in this survey, distributed among seven nations and 35 cities. One reporting nation and four reporting cities had no trend analysis. Thirteen cities reported a trend for only one pollutant. All nations reporting trends showed some changes from previous reports. Most trends were based on annual averages of ambient concentrations, mostly using the statistical differences between time periods. Monthly, quarterly, and semi-annual means and percentiles and frequency distributions also were used in various cities. Seven cities used some combination of these parameters.

The trend analyses reported were predominantly for TSP and SO_x (26 each), but some analyses of trends for carbon monoxide (18), oxidants (6) and nitrogen oxides (5) were reported. Almost half of reported trends (38) were for periods ending in 1977 or 1978, in contrast to earlier surveys which included few recent trends. A few of the trends reported were for periods of as little as a single year, ending as long ago as 1972. The average length of the monitoring period over which analyses had been performed was 6 years.

Forty-three cases of improving air quality (constantly decreasing ambient concentration) and eighteen cases of stable air quality over the

	TSP	SO_x	CO	O_x	NO_x
BELGIUM					
Brussels					
CANADA					
Montreal	1967-77 ↘	1967-77 ↘	1967-77 ↘	1967-77 →	1967-77 ↗
Ottawa	1970-77 ↘↗	1970-77 ↘	1973-77 ↘	1975-77 →	1975-77 →
Toronto	1962-77 ↘→	1970-77 ↘→	1970-77 ↗→	1973-77 ?	1974-77 ↗
Vancouver	1970-77 ↘→	1972-77 ↘→	1974-77 →	1973-77 →	
DENMARK					
Copenhagen					
FRANCE					
Marseille	1973-77 ↘	1973-77 ↘			
Paris	1973-77 ↘	1973-77 ↘			
GERMANY (Fed. Rep.)					
Cologne		1971-72 ↘			
Dortmund		1971-72 ↘			
Dusseldorf		1971-72 ↘			
Essen		1971-72 ↘			
Frankfurt		1963-77 ↘↘	1966-73 ↗↘		
Hamburg		1959-77 →			
Munich		1965-77 ↘→	1970-77 ↘↗		
Stuttgart					
GREECE					
Athens					
ICELAND					
Reykjavik					
ITALY					
Genoa					
Milan		1970-77 ↘→			
Naples					
Palermo					
Rome					
Turin					
LUXEMBOURG					
Luxembourg City					

FIGURE 10
Ambient Air Quality Trend Analysis

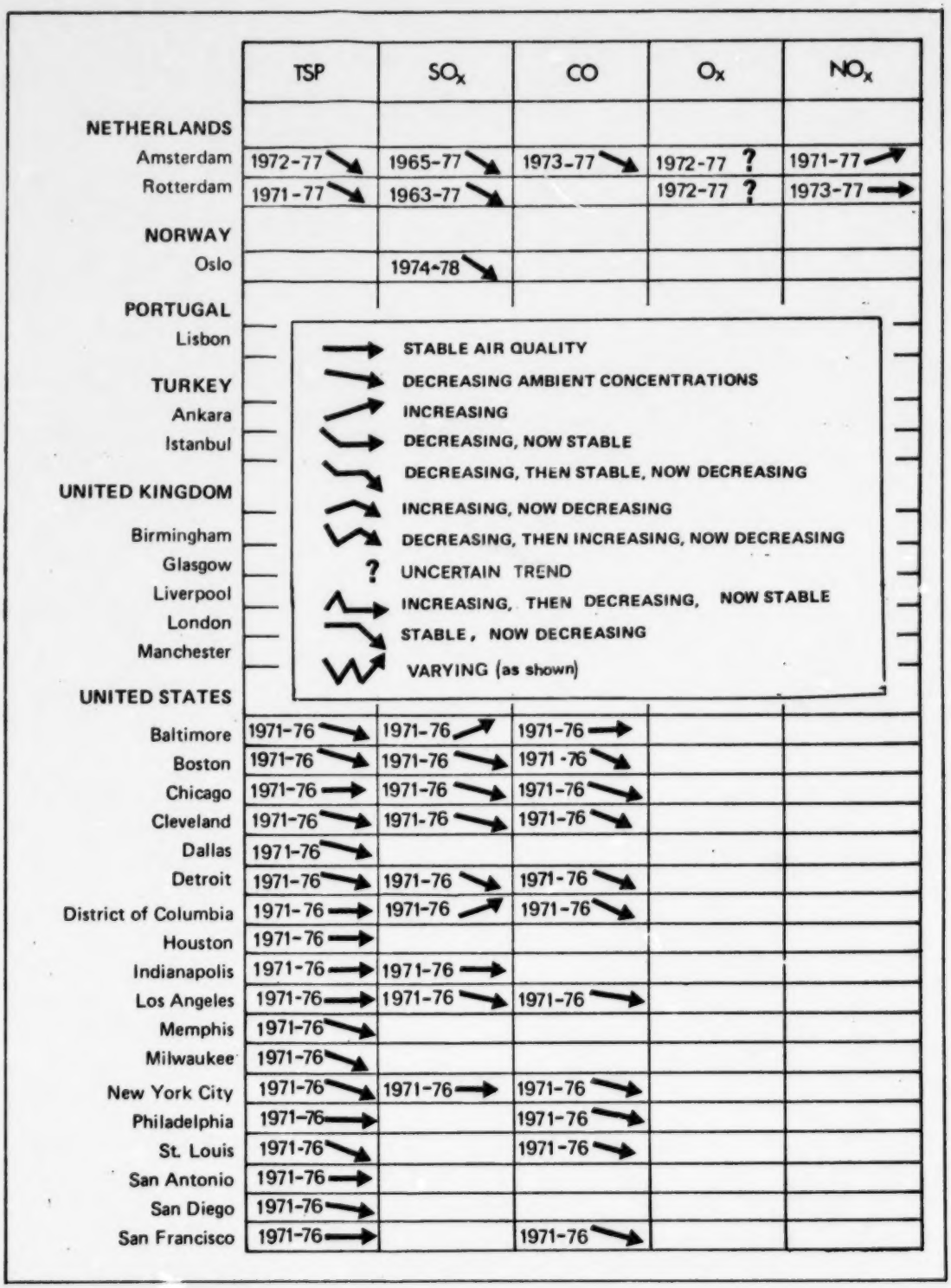

FIGURE 10 (continued)
Ambient Air Quality Trend Analysis

	TSP	SO_x	CO	O_x	NO_x
STABLE AIR QUALITY	8	3	2	3	2
DECREASING AMBIENT CONCENTRATIONS	15	16	12		
INCREASING		2			3
DECREASING, NOW STABLE	2	3			
DECREASING, THEN STABLE, NOW DECREASING		2			
INCREASING, NOW DECREASING			1		
DECREASING, THEN INCREASING, NOW DECREASING	1				
UNCERTAIN TREND				3	
INCREASING, THEN DECREASING NOW STABLE			1		
STABLE, NOW DECREASING			1		
VARYING (as shown)			1		

FIGURE 11
Summary of Air Quality Trends

entire analysis period were reported. There were five reported cases of air quality declining over the entire analysis period. A number of variable and uncertain trends were also reported, as shown in Figure 11. The increase in reporting of CO and NO_x trend analyses accounted for 13 of the 18 additional trends reported in this year's survey. Except for generally negative NO_2 trends (2 stable, 3 increasing), no group of trends appears to be distinctly better or worse than any other. However, changes and additions from the 1977 survey favored the TSP group, as two increasing TSP trends were reversed and two SO_2 trends changed from other categories to increasing.

ACTIVITIES OF NATIONAL, REGIONAL, AND LOCAL AUTHORITIES

Figure 12 provides an overview of the division of responsibility and activity in air pollution control in North Atlantic Council countries. It is based on the responses to various questions related to standards, monitoring and auto surveillance for emission factor development. Figure 12 indicates that there is considerable variety in the division of responsibility between national, regional, and local authorities. Four nations rely on national standard-setting and administration and support by some combination of national, regional, local and other organizations. One nation groups most activity at the regional level, with general national support and local standard-setting and administration in one region. Another relies on local authorities in its largest city and some support from national institutes. Responses in this area are generally the same as in previous years. New national responsibilities were reported in standard-setting and monitoring and auto surveillance, in addition to information for nations not reporting in 1977.

	STANDARD-SETTING	MONITORING	AUTO SURVEILLANCE
BELGIUM			
CANADA	N,R,L	N,R,L	N
DENMARK			
FRANCE		L,O	
GERMANY (Fed. Rep.)	N	N,R	N
GREECE		N	O
ICELAND			
ITALY	N	R,L,O	
LUXEMBOURG			
NETHERLANDS	N,R,L	N,R,L	
NORWAY	N	L,O	
PORTUGAL			
TURKEY			
UNITED KINGDOM			
UNITED STATES	N	N,R,L	N

N– NATIONAL/FEDERAL
R– REGIONAL/STATE/PROVINCIAL
L– LOCAL/MUNICIPAL
O– OTHER (PRIVATE ORGANIZATIONS, INSTITUTES)

FIGURE 12
Activities of National, Regional, and Local Authorities, 1977

DATA AVAILABILITY

Recommendation IV of the Air Pollution Pilot Study encourages establishment of systems for monitoring data storage and retrieval as essential to successful control efforts. Figure 13 summarizes the availability of various data elements by nation. Data were considered "available" if they were reported for one or more cities in a nation, in this year's survey.

Some nations had relatively uniform sets of data for all cities, while some nations had considerable internal variety in pollutants measured and time periods. Most cities reported availability of ambient air quality data for SO_2 and TSP (or other equivalent/related pollutants such as soot, dust, or smoke). Monitoring for CO was more common than for O_x or NO_x. All eight reporting nations had data available on at least two pollutants, and four nations had data on five or more. One nation failed to report ambient statistics on one pollutant reported in previous surveys. Two reporting nations added one or more pollutants over previous survey responses.

Data on emissions was slightly less common, but more uniform within nations, than ambient air quality data. Six nations reported having emissions data available. Two of these nations had only one or two estimates for single cities, while the others had more complete inventories. One nation reported a considerable improvement in emission data availability. Four nations also have sets of emission factors available for possible synthesis of emission inventories.

	POINT SOURCES	STATIONARY AREA SOURCES	MOBILE AREA SOURCES	LINE SOURCES	EMISSION FACTORS	AMBIENT AIR QUALITY
BELGIUM						
CANADA	ALL	ALL	ALL		●	TSP, SO_2, CO, O_x, NO_x
DENMARK						
FRANCE	SO_2	SO_2				TSP, SO_2, CO, O_x, HC, NO_x
GERMANY (Fed. Rep.)						TSP, SO_2, CO NO_x
GREECE	TSP, SO_2	ALL	ALL	ALL	●	TSP, SO_2
ICELAND						
ITALY		SO_2				TSP, SO_2, CO
LUXEMBOURG						
NETHERLANDS						TSP, SO_2, CO O_x, NO_x
NORWAY	SO_2	SO_2	ALL	ALL	●	TSP, SO_2
PORTUGAL						
TURKEY						
UNITED KINGDOM						
UNITED STATES	ALL	ALL	ALL		●	TSP, SO_2, CO, O_x, NO_x

ALL = TSP, SO_2, CO, HC, NO_x

FIGURE 13
Data Availability

APPENDIX

AIR POLLUTION PILOT STUDY

RECOMMENDATIONS

Committee on the Challenges of Modern Society

(1974)

AIR POLLUTION PILOT STUDY

RECOMMENDATIONS

Fifteen recommendations were derived from the results of the Pilot Study. Adoption of these recommendations will demonstrate that member nations have dedicated themselves to acting on the results of this pilot effort and will move toward a dynamic and systematic solution of our common air pollution problems.

Seven recommendations are made for assessment of air quality: the first general, the second three for monitoring, and the remaining three for emissions inventory:

RECOMMENDATION I

Member nations will assess the air pollution in cities of 100,000 inhabitants or more and in industrial areas within their national boundaries. Member nations should establish such assessments by 1980.

RECOMMENDATION II

Member nations will establish effective air quality monitoring systems including the measurement of meteorological parameters.

RECOMMENDATION III

Member nations will employ reference methods endorsed by the World Health Organization (WHO),

The Organization for Economic Cooperation and Development (OECD), and/or International Standards Organization, or alternative methods which have been shown to be comparable to these reference methods.

RECOMMENDATION IV

Member nations will establish systems for monitoring data storage and retrieval such as those employed by the WHO.

RECOMMENDATION V

Member nations will conduct emissions inventories employing the uniform procedures based on the experiences derived from the CCMS assessment studies.

RECOMMENDATION VI

Member nations will cooperate to develop standardized methods for emissions data storage and retrieval to support requirements in the conduct of national air quality management programs. The U.S. National Emission Data System (NEDS) might serve as a model for a common international system.

RECOMMENDATION VII

Member nations will cooperate to develop standardized techniques for projecting emissions and predicting future ambient air quality.

Recommendations regarding air quality criteria are:

RECOMMENDATION VIII

Member nations, in accordance with national priorities, will set ambient air quality standards or objectives. The criteria documents developed in CCMS and the guides and criteria developed by WHO should be used in this process.

RECOMMENDATION IX

Member nations will participate in the WHO program for development of criteria documents as well as in the revision of existing criteria documents.

RECOMMENDATION X

Member nations will support strongly national research programs and cooperate internationally for the purpose of developing additional criteria on the environmental effects of all air pollutants.

The recommendations regarding control technology are:

RECOMMENDATION XI

Member nations will use inter alia CCMS control technology documents in developing plans for applying control to existing pollution sources to improve air quality.

RECOMMENDATION XII

Member nations will, in the course of industrial expansion, employ the best available and practicable control technology on an industry-by-industry basis.

RECOMMENDATION XIII

Member nations will assure the exchange of new information on research, development, and demonstration of the control technology. CCMS derived control technology documents should be updated periodically to reflect significant advances. The appropriate international body for this effort is the WHO International Reference Center for Air Pollution Control.

The recommendation resulting from the modeling activity is:

RECOMMENDATION XIV

Member nations agree that the CCMS modeling activity has shown that there is a widespread need for further international cooperation to accomplish the following tasks:

- To continue to bring together model developers and air quality managers for exchange of ideas, discussion of users' needs and demonstration of modeling techniques.
- Standardize modeling techniques for specific air quality management applications and consider how computerized models might be made available for all users.

- Continue to review on-going air quality assessment studies.

The recommendation for LPPSD is:

RECOMMENDATION XV.

Participating nations agree to take necessary actions to implement fully the memorandum of understanding, with emphasis on collaboration on the total systems approach for developing environmentally compatible motor vehicles taking into account air quality, safety, energy, and noise.